

[TRANSLATION]

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NOTICE REQUESTING SUBMISSION OF OPINION

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Case: Patent Application No. 10-2004-0077658

Title: METHOD OF FORMING A READ SENSOR USING
PHOTORESIST STRUCTURES WITHOUT
UNDERCUTS WHICH ARE REMOVED USING
CHEMICAL-MECHANICAL POLISHING (CMP) LIFT-
OFF PROCESSES

As the above-identified application, upon examination, has been rejected on the following grounds, this Notice is hereby made pursuant to Article 63 of the Patent Act. If the applicant should have any arguments or would like to make an amendment to the application, the applicant may submit such arguments [Annexed Form No. 24 to the Implementing Regulations under the Patent Act] and/or amendment [Annexed Form No. 9 to the Implementing Regulations under the Patent Act] to this Office by the response deadline noted above. [This deadline may be extended upon request on a monthly basis up to six months from the issuance date of this Office Action. If necessary, an extension of time for two to four months can be requested at one time. To obtain an additional extension of time exceeding six months after the issuance date of this Office Action, a request for the additional extension of time along with a written statement showing good cause (see the "Guidelines for Additional Extension of Time" in the end of this Notice) should be submitted.]

RESULTS OF EXAMINATION

Examined Claims: Claims 1 through 30

Rejection:

No.	Rejection	Basis of Rejection
I	Claims 9, 11, 21, 22, 27, and 28	Article 42(4)(ii) of the Patent Act [Defective Language in the Claims]*
II	All Claims	Article 29(2) of the Patent Act [Lack of Inventive Step]*

GROUND I
[Defective Language in the Claims]*

Claims 9, 11, 21, 22, 27, and 28 of the Subject Application are defective in language for the reasons set forth in the “Remarks” section below. Accordingly, pursuant to Article 42(4)(ii) of the Patent Act, the Subject Application cannot be allowed.

REMARKS

The expression, “about,” in Claims 9, 11, 21, 22, 27, and 28 renders the scope of protection unclear. Thus, these claims do not comply with Article 42(4)(ii) of the Patent Act.

GROUND II
[Lack of Inventive Step]*

The invention in the claims of the Subject Application could have easily been conceived by one of ordinary skill in the art prior to the filing of the Subject Application for the reasons set forth in the “Remarks” section below. Accordingly, pursuant to Article 29(2) of the Patent Act, the Claimed Invention cannot be patented.

REMARKS

A. Independent Claim 1

Claim 1 of the Subject Application relates to a method for use in forming a read sensor for a magnetic head, comprising: prior to forming a trackwidth of the read sensor: forming a photoresist layer in a central region over a plurality of read sensor layers (“Step A”); etching the read sensor such that end portions of the read sensor layers are removed and the central portion remains underneath the photoresist layer, to thereby define a stripe height for the read sensor (“Step B”); and removing the photoresist layer (“Step C”).

Steps A to C in Claim 1 correspond to forming a photoresist pattern over a plurality of layers for forming a GMR element, as disclosed in Fig. 14 and paragraph <70> of Japanese Unexamined Patent Publication No. Hei 13-084535 (March 30, 2001; “Cited Reference 1”), etching the plurality of layers to pattern them according to first and second etching steps, as disclosed in paragraph <76> of Cited Reference 1, and lifting-off the photoresist pattern, as disclosed in paragraph <77> of Cited Reference 1, respectively. Although the invention in Claim 1 is distinguishable from Cited Reference 1 in terms of removing the photoresist layer through mechanical interaction with a chemical-mechanical polishing (CMP) pad, this constitution lacks technical difficulty because it is generally used in the art. Further,

that constitution does not result in any remarkable effect that cannot be predicted from Cited Reference 1. Thus, the invention in Claim 1 could have easily been conceived by one of ordinary skill in the art from Cited Reference 1.

B. Dependent Claim 2

Claim 2 of the Subject Application is characterized in that the photoresist layer is formed without an undercut. However, paragraph <22> of Japanese Unexamined Patent Publication No. Hei 15-142422 (May 16, 2003; "Cited Reference 2") discloses that a rectangular cross section film or a trapezoidal cross section film is used to form a patterned first film (104). Thus, the invention in Claim 2 could have easily been conceived by one of ordinary skill in the art from a combination of Cited References 1 and 2.

C. Dependent Claims 3 and 4

Claims 3 and 4 of the Subject Application are characterized by further comprising forming a second photoresist layer, etching the read sensor layers such that a central portion remains underneath the second photoresist layer, depositing bias and lead layers, and removing the second photoresist layer. However, paragraphs <80> to <83> of Cited Reference 1 disclose forming an additional photoresist pattern (23) over a GMR element and then etching the ends located in the outer portions of the pattern (23) in order to define a trackwidth; utilizing an exchange bias method; and lifting-off a photoresist pattern.

D. Dependent Claims 5 through 8

Claims 5 and 8 of the Subject Application are characterized by further comprising forming an insulator layer, and forming a protective layer over materials comprising one of insulator materials or lead materials. However, these characteristics correspond to forming a second shield cap film made of an insulating material, such as alumina, prior to lifting-off a photoresist pattern as a second insulating layer around a GMR element, as disclosed in paragraph <77> of Cited Reference 1, and forming a protection layer, as disclosed in paragraph <68> of Cited Reference 1, respectively. Further, Claims 6 and 7 of the Subject Application are characterized by further comprising mechanically compressing the photoresist and forming a protective layer between the read sensor layer and photoresist layer. However, these constitutions can easily be conceived by one of ordinary skill in the art from Cited Reference 1.

E. Dependent Claims 9, 10, and 11

Claims 9, 10, and 11 of the Subject Application are characterized by further comprising forming the protective layer to a thickness of between about 50 to 200 Angstroms; protective layer comprising carbon; and protective layer comprising carbon having a hardness of about 22 GPa. However, the specification of Cited Reference 1 describes the formation of a shield cap film to have a thickness of 20 to 30 nm. Additionally, the limitation of a protective layer to comprise carbon and the limitation of a hardness are generally known in the art and lack an inventive step.

F. Independent Claim 12

Claim 12 of the Subject Application relates to a method for use in making a read sensor for a magnetic head, comprising: defining a stripe height for read sensor by forming a first photoresist layer, etching a read sensor layer, and removing the first photoresist layer; and defining a trackwidth by forming a second photoresist layer, etching the read sensor, and removing the second photoresist layer.

The characteristics in Claim 12 correspond to forming a photoresist pattern over a plurality of layers for forming a GMR element, as disclosed in paragraph <70> of Cited Reference 1; etching the plurality of layers to pattern them according to first and second etching steps and lifting-off the photoresist pattern, as disclosed in paragraphs <76> and <77> of Cited Reference 1; and forming an additional photoresist pattern (23) over a GMR element and then etching the ends located in the outer portions of the pattern (23) in order to define a trackwidth, as disclosed in paragraphs <80> to <83> of Cited Reference 1.

Although the invention in Claim 12 is distinguishable from Cited Reference 1 in terms of removing the photoresist layer through mechanical interaction with a CMP pad, this constitution lacks technical difficulty because it is generally used in the art. Further, that constitution does not result in any remarkable effect that cannot be predicted from Cited Reference 1. Thus, the invention in Claim 12 could have easily been conceived by one of ordinary skill in the art from Cited Reference 1.

G. Dependent Claims 13 and 14

Claims 13 and 14 of the Subject Application are characterized by further comprising forming an insulator layer and depositing bias and lead layers. However, these characteristics correspond to forming a second shield cap film made of an insulating material, such as alumina, and utilizing an exchanging bias method, as disclosed in Cited Reference 1.

H. Dependent Claim 15

Claim 15 of the Subject Application is characterized in that the first and second photoresist layers are formed without undercuts. However, paragraph <22> of Cited Reference 2 discloses that a rectangular cross section film or a trapezoidal cross section film is used to form a patterned first film (104). Thus, the invention in Claim 15 could have easily been conceived by one of ordinary skill in the art from a combination of Cited References 1 and 2.

I. Dependent Claims 16, 17, and 18

Since Claims 16, 17, and 18 of the Subject Application have the same technical characteristics as Claims 6, 8, and 10, they cannot be allowed for the same reasons as Claims 6, 8, and 10.

J. Dependent Claims 19 through 22

Claims 19 through 22 of the Subject Application are characterized by forming first and second protective layers and limiting the materials, hardness, and thickness of the first and second protective layers. However, the first and second protective layers are nothing more than a simple design modification of the protection layer in paragraph <68> of Cited Reference 1. Additionally, the limitation of the thickness of the protective layers can easily be conceived by one of ordinary skill in the art from the limitation of the thickness of the shield cap film in Cited Reference 1. Finally, the limitation of material and hardness of the protective layers is generally known in the art and lack an inventive step.

K. Independent Claim 23

Claim 23 of the Subject Application relates to a method of forming a read sensor of a magnetic head, comprising: forming a photoresist without undercuts; forming a protective layer; etching the read sensor; and removing the photoresist through mechanical interaction with a CMP pad.

However, Cited Reference 2 discloses that a rectangular cross section film or a trapezoidal cross section film is used to form a patterned first film (104). Additionally, Cited Reference 1 discloses etching the plurality of layers to pattern them according to first and second etching steps and lifting-off the photoresist pattern.

Although the invention in Claim 23 is distinguishable from Cited Reference 1 in terms of removing the photoresist layer through mechanical interaction with a CMP pad, this constitution lacks technical difficulty because it is generally used in the art. Further, this constitution does not result in any remarkable effect that cannot be predicted from Cited Reference 1. Thus, the invention in Claim 23 could have easily been conceived by one of ordinary skill in the art from a simple combination of Cited References 1 and 2.

L. Dependent Claims 24 and 25

Claims 24 and 25 of the Subject Application are characterized by further comprising forming a photoresist without undercuts, etching a read sensor layer, and removing the second photoresist layer through mechanical interaction with a CMP pad. However, these characteristics correspond to forming an additional photoresist pattern (23) over a GMR element and then etching the ends located in the outer portions of the pattern (23) in order to define a trackwidth, as disclosed in paragraphs <80> to <83> of Cited Reference 1. Thus, the invention in Claims 24 and 25 could have easily been conceived by one of ordinary skill in the art from a simple combination of Cited References 1 and 2.

M. Dependent Claims 26 through 30

Claims 26 through 30 of the Subject Application limit the materials, hardness, thickness, and location of the protective layer. However, the protective

layer is nothing more than a simple design modification of the protection layer in paragraph <68> of Cited Reference 1. Additionally, the limitation of the thickness of the protective layer can easily be conceived by one of ordinary skill in the art from the limitation of the thickness of the shield cap film in Cited Reference 1. Finally, the limitation of material, hardness, and location of the protective layer is generally known in the art and lack an inventive step.

Accordingly, the claims of the Subject Application cannot be allowed pursuant to Article 29(2) of the Patent Act.

Document(s) Annexed:

Japanese Unexamined Patent Publication No. Hei 13-084535 (March 30, 2001)
Japanese Unexamined Patent Publication No. Hei 15-142422 (May 16, 2003)

This 12th day of March, 2010

Patent Examiner [SEAL]
Information Systems Examination Division
Information & Communications Examinations Bureau
Korean Intellectual Property Office

Guidelines for Additional Extension of Time

If an applicant submits a request for an additional extension of time exceeding six (6) months after the issuance date of an Office Action, along with a written statement showing good cause for the additional extension of time, the Examiner will review the statement to determine whether good cause is shown in allowing additional time extension set forth below. If the request is granted, the Examiner will notify the applicant of the extendible deadline.

[Good Cause for Additional Extension of Time]

1. Where an applicant appoints attorney(s) for the first time, or dismisses or changes all already appointed attorneys within one month prior to the expiry of six (6) months from the issuance date of the Office Action.
2. Where a petition to change an applicant is submitted within one month prior to the expiry of the six (6) months from the issuance date of the Office Action.
3. Where an amendment is filed to reflect examination results, which are issued by foreign patent offices within two (2) months prior to the expiry of six (6) months from the issuance date of the Office Action.
4. Where the delivery of an Office Action is delayed one or more months.
5. Where a parent or divisional application is pending in a trial or litigation.
6. Where an applicant requires more time to perform experiments or verify measurements.
7. Other good causes such as occurrence of unavoidable circumstances which are not attributable to the applicant as determined at the discretion of the Examiner.

* “[]” not in original; Inserted by Lee International.